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AUTOMOTIVE INDUSTRIES

NUMBER ONE IN THE INDUSTRY SINCE 1895

GM'S $2 BILLION GAMBLE

WILL TRADITIONAL 'BIG CAR' CUSTOMERS BUY DOWNSIZED C-CARS?

66TH ANNUAL SPECIFICATIONS SECTION

News/Analysis:
Has Long-Term Planning Hurt Short-Term Capacity?

AUTOMOTIVE INDUSTRIES

April, 1984/Volume 164, Number 4

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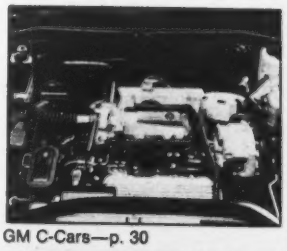

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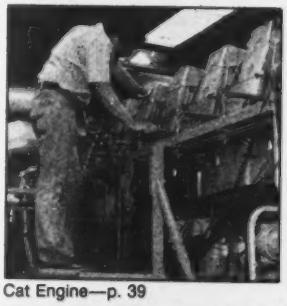

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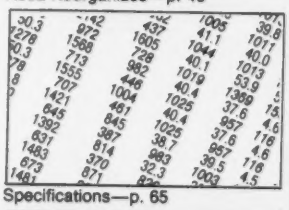

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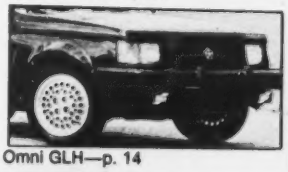
COVER

The king of the new C-cars, Cadillac's DeVille/Fleetwood range, may shock a lot of traditional, conservative consumers.

NEXT MONTH

An analysis of the storm clouds brewing between labor and Detroit, plus a look at steel's revitalization are yours in May.



Omni GLH—p. 14

QUOTABLE

"It's ridiculous to assume that 200,000 cars will ruin GM. One, it'll provide 12,000 jobs; two, we have an empty plant; three, we want to provide our dealers with something *now*."—GM chairman Roger Smith, referring to the GM/Toyota project.

"Black is like a woman in tight jeans—every defect shows. But we've got it down."—Pontiac general manager William Hoglund, apparently alluding to the division's progress in painting Fieros something other than red or white.

Garrett Turbo—p. 25

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ONE OF THE ABC PUBLISHING COMPANIES

AI'S TOTAL CAR COEFFICIENT

Wherein we multipy a car's interior volume by it's EPA city mpg and divide the result by it's 0-60 mph time and retail price. Proving once again that big, miserly, fast and cheap cars are very hard to come by.

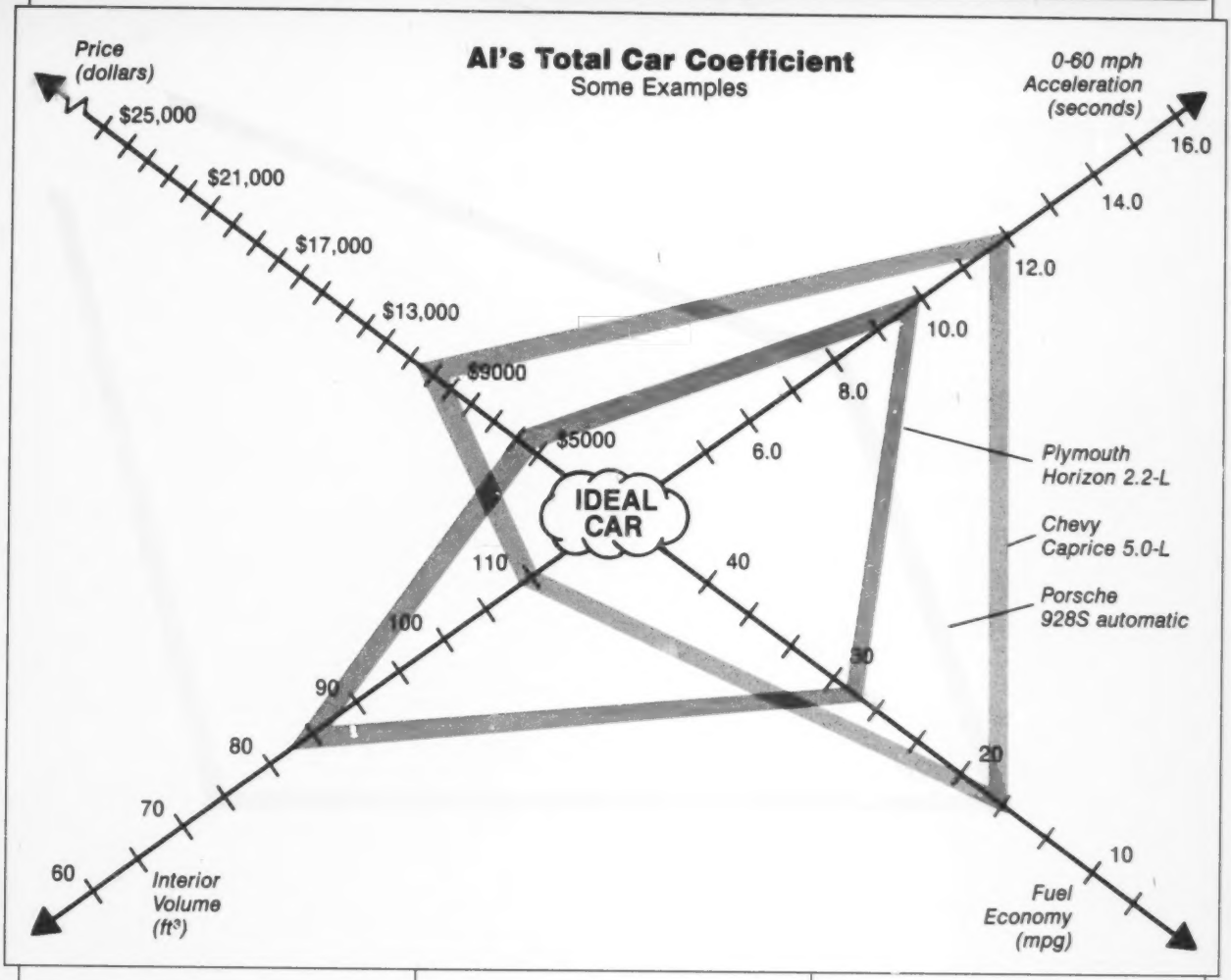
TCC	Under $8000
.41	**Plymouth Horizon, 2.2-L, 5-spd man.**
.38	Toyota Starlet, 4-spd man.
.37	Plymouth Horizon, 1.6-L, 4-spd man.
.33	Dodge Colt Turbo, 4x2-spd man.
.33	VW Rabbit L Diesel, 4-spd man.
.32	Dodge Omni GLH, 2.2-L, 5-spd man.
.31	Honda Civic S, 1.5-L, 5-spd man.
.29	Toyota Corolla LE, 1.6-L, 5-spd man.
.29	Toyota Tercel SR5, 5-spd man.
.27	Pontiac Phoenix, V6, 4-spd man.
.27	Chevy Cavalier Type 10, 5-spd man.
.27	Chevy Citation X-11, HO V6, 4-spd man.
.26	Renault Encore GS, 5-spd man.
.24	Ford Tempo GL, 5-spd man.
.23	Mercury Topaz LS, 5-spd man.
.22	Ford Escort GT, 5-spd man.
.19	**Pontiac 1000, 1.6-L, A/T**
.19	**Renault Alliance, A/T**
.29	**Group Average**

TCC	$8000 to $12,000
.25	**Mitsubishi Tredia Turbo, 5-spd man.**
.24	Dodge Shelby Charger, 5-spd man.
.24	Pontiac 2000 SE Turbo, 4-spd man.
.23	VW Rabbit GTI
.23	VW Jetta GLI
.22	Dodge Colt Vista, 5-spd man.
.22	Toyota Camry, 2.0-L, A/T
.22	Nissan Stanza GL, 5-spd man.
.22	Honda Prelude, 5-spd man.
.21	Chevrolet Celebrity EuroSport, HO V6, A/T
.21	Toyota Celica GT-S, 5-spd man.
.21	Dodge 600 ES Turbo, 5-spd man.
.20	Buick Skyhawk T-Type, 1.8-L, 5-spd man.
.19	Dodge Daytona Turbo Z, 5-spd man.
.19	Mazda 626 TS, 5-spd man.
.19	Chrysler E-Class, 2.6-L, A/T
.18	Pontiac 6000 LE, 2.5-L, A/T
.18	Ford Mustang GT, 5.0-L, 5-spd man.
.17	Chevrolet Monte Carlo SS, HO 5.0-L, A/T
.17	Mercury Marquis, V6, A/T
.17	Ford LTD LX, 5.0-L, A/T
.17	Buick Skyhawk T-Type, 1.8-L, A/T
.17	VW Scirocco, 5-spd man.
.16	Olds Cutlass Ciera, 3.0-L, A/T
.16	Chevy Caprice Classic, 5.0-L, A/T
.15	Pontiac Firebird, 2.5-L, 4-spd man.
.15	Chevy Camaro Z-28, H0 5.0-L, 5-spd man.
.14	Chrysler Laser XE Turbo, A/T
.14	Oldsmobile Cutlass Supreme, 5.0-L, A/T
.14	Isuzu Impulse, 5-spd man.
.10	**Subaru GL 4WD Turbo, A/T**
.19	**Group Average**

TCC	$12,000 to $18,000
.19	**Buick Regal Turbo T-Type, V6, A/T**
.16	Ford T-Bird Turbo Coupe, 5-spd man.
.16	Mercury Cougar XR7 Turbo, 5-spd man.
.15	Toyota Cressida, 5-spd man.
.14	Pontiac 6000 STE, HO V6, A/T
.14	Ford Mustang SVO, 5-spd man.
.13	Volvo Turbo GLT, A/T
.13	BMW 318i, 5-spd man.
.11	Saab 900 Turbo, 5-spd man.
.11	Audi 5000S, 5-spd man.
.10	Audi 4000S Quattro, 5-spd man.
.08	**Cadillac Sedan DeVille, 4.1-L, A/T**
.13	**Group Average**

TCC	Over $25,000
.08	**BMW 533i, 5-spd man.**
.07	Porsche 911 Carrera
.04	Porsche 928S, 5-spd man.
.04	Jaguar XJ-S, A/T
.04	Porsche 928S, A/T
.03	**Mercedes 500 SEC**
.05	**Group Average**

TCC	$18,000 to $25,000
.09	**Volvo 760 GLE TD, 4-spd OD man.**
.08	Audi 5000S Turbo, A/T
.08	Mercedes 190E, 5-spd man.
.07	Porsche 944, 5-spd man.
.06	**Lincoln Mk VII LSC, 5.0-L, A/T**
.08	**Group Average**



by Lance A. Ealey

The big winner in *AI's* Total Car Coefficient (TCC) rating this year is the Plymouth Horizon with 2.2-L four and 5-speed manual transaxle. The Horizon racked up a best ever TCC of .41, well above last year's two winners, the Toyota Tercel Deluxe and the Dodge Omni 2.2-L, both of which earned .37 TCCs (see April '83, "AI's Total Car Coefficient Sums It Up," p. 24-B).

The TCC formula is: (interior volume x mpg) ÷ (0-60 mph time x price) x 10 = TCC.

Interior volumes and city mpg figures come from the EPA, retail FOB or POE prices are taken from the *Kelley Blue Book Fourth Edition*. The only options figured into the base retail price were those affecting performance—engine, transmission, etc.

Zero to 60 mph times were generated by *AI* with an appreciated assist from PBS's *MotorWeek*. Additional, hard to get figures were taken from various enthusiast magazines. We multipy the result by 10 simply for readability.

The Toyota Tercel we tested this year was the SR5 model, which rated a TCC of .29. The interior volume and city mpg for the '83 and '84 models were identical. However, the car tested last year was a second faster to 60 mph, and its price was almost $1000 less than the 1984 SR5.

The Horizon's 0-60 time was the key to why it beat last year's Omni. It was almost a second quicker. The only other variable was the Horizon's slightly lower price.

The Chevy Monte Carlo SS, Mercury Marquis, Ford LTD LX, Buick Skyhawk and VW Scirocco all earned .17 TCCs, with the spread going from 0-60 times of 15.9 to 8.8 seconds, fuel economy from 27 to 17 mpg, interior volumes from 73 to 97 cu ft and prices from $8472 to $10,870.

That all 5 cars earned similar TCCs shows how negative attributes can be balanced by positive ones when all four TCC values are taken into account. Obviously, one would not group a Volkswagen Scirocco with a Mercury Marquis—the cars are targeted for very different audiences. Nevertheless, their TCCs indicate a balancing factor between the two. For the VW, it was its performance and fuel economy; for the Marquis, interior volume and lower price were the keys. ■

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VOLVO																								
DL, GL (2D, 4D, Wagon)	USA		FR	4	141	3.78x3.15	114@5400	133@3500	10.3	EFI	104.3	56.3	53.5	188.8	67.2	56.4[4]	2888	175SR14	Auto/Man	4/5	Strut	LA,CS	4WD
	Metric				*2.3*	*96x60*					*2649*	*1430*	*1353*	*4795*	*1709*	*1427*	*1327*						
Diesel (4-Dr., Wagon)	USA		FR	6	145	3.01x3.40	80@4800	103@2800	23.0	FI	104.3	56.3	53.5	188.8	67.2	56.2[4]	3098	185/70SR14	Auto/Man	3/5	Strut	LA,CS	4WD
	Metric				*2.4*	*76.5x86.4*					*2649*	*1430*	*1353*	*4795*	*1709*	*1427*	*1419*						
GLT Turbo (2D, 4D, Wagon)[37]	USA		FR	4	130	3.62x3.15	162@5100	181@3900	7.5	FI	104.3	56.3	53.5	188.8	67.2	56.2[4]	2992	195/60R15	Auto/Man	4/5	Strut	LA,CS	4WD
	Metric				*2.1*	*92x60*					*2649*	*1430*	*1353*	*4795*	*1709*	*1427*	*1369*						
760 GLE Gas	USA		FR	6	173	3.58x2.87	134@5500	159@2750	8.8	FI	109.1	57.5	57.5	188.4	68.9	55.5	2979	195/60R15	Auto.	4	Strut	LA,CS[38]	4WD
	Metric				*2.8*	*91x73*					*2771*	*1460*	*1460*	*4785*	*1750*	*1409*	*1352*						
760 GLE Turbo Diesel	USA		FR	6	145	3.01x3.40	106@4800	140@2400	23.0	FI	109.1	57.5	57.5	188.4	68.9	55.5	3221	195/60R15	Auto/Man	4/5	Strut	LA,CS[38]	4WD
	Metric				*2.4*	*76.5x86.4*					*2771*	*1460*	*1460*	*4785*	*1750*	*1409*	*1431*						

ABBREVIATIONS:
A—"A" Arm
ARB—Auto-Roll Bar
Auto—Automatic
BA—Beam-Type Axle
BL—Bar link
CFI—Continuous fuel injection
CS—Coil Spring
DA—Double "A" Arms
DO—De Dion
DF—Disc front/drum rear
DLX—Deluxe
DPA—Diagonal pivot axle
EFI—Electronic fuel injection
F—France
FI—Fuel injection
FL—Fixed length drive shaft
FR—Front
GB—Great Britain
H—Hydraulic shocks
I—Italy
Ind—Independent
IJ—Integral stabilizer
IW—Independent wishbone
J—Japan
L—4-link
LA—Live axle
LL—Lateral link
LS—Leaf spring
LTR—4 links with track rod
Man—Manual
MFI—Mechanical fuel injection
MID—Midship
NI—Northern Ireland
NR—Negative rolling radius
RO—Rotary Engine
R—Rear
RA—Rigid axle
RTB—Rear torsion bar
S—Sweden
SB—Stabilizer bar
STA—Semi-trailing arms
T—Trailing arms
TBA—Torsion Beam Axle
TBI—Throttle body fuel injection
TBS—Torsion bar spring
TCA—Torsion crank axle
TTL—Twin trapezoidal links
TW—Trailing arms and watt links
UW—Unequal length wishbone
V—Ventilated disc
W—Upper & lower wishbone
WG—West Germany
4WD—4-wheel disc
4WD-R—4-wheel disc, inboard at rear

FOOTNOTES:
[1]—Automatic available
[2]—Lower wishbone
[3]—Panhard rod
[4]—4-speed automatic available
[5]—Diesel available, 6 cyl, 2.8-L, 80 hp @ 4800 rpm, 120 lb ft @ 2400 rpm
[6]—Turbo: 200 hp @ 5200 rpm, 227 lb ft @ 3600, 7.8:1 compression
[7]—Hatchback 2-dr Deluxe width: 65.2 in.
[8]—Hatchback height: 53.3 in.
[9]—Borg-Warner 5-spd man. available on Turbo
[10]—Hatchback: 175/70SR13
[11]—Turbo: 2-seater, 2992 lb
[12]—Mpg 2-dr: 1840 lb; STD 2-dr: 1850 lb; STD 4-dr: 1855 lb; Hatchback: 1915 lb
[13]—2-dr Deluxe: 2190 lb; 4-dr Deluxe: 2215 lb
[14]—Standard, other sizes available
[15]—see US listings for 4-dr Accord
[16]—Touring Sedan & Coupe: 53.7 in.
[17]—Coupe: 2385 lb
[18]—GLC Sport Coupe & Sport Sedan: 175/70SR13
[19]—Listed tires are for S; GS and GSL get 185/70HR13
[20]—Deluxe: 185/70HR14
[21]—49 states: 2445 lb or 110 kg; CA: 2435 lb or 1105 kg
[22]—GSL model has 4WD
[23]—4+4 and 3-speed automatic available
[24]—5-speed manual & 3-speed automatic available
[25]—175SR14 for 505GL & 505S sedan; 190/65 x 390 for 505STI
[26]—4WD on 505S & STI; front disc, rear drum on 505GL
[27]—With manual trans.; 3385 lb with automatic
[28]—See US listings for Alliance and Encore
[29]—195/60SR15 or 3-dr Turbo
[30]—Liftback: 176.6 in.
[31]—SR5 Liftback height: 54.7 in; weight: 2825 lb
[32]—Liftback GT: 2566 lb; GT-S: 2705 lb
[33]—5-speed manual available on sedan
[34]—See US listings for Rabbit specs
[35]—For station wagons: 180.2 in. or 4580 mm
[36]—For station wagons: 2601 lb or 1181 kg
[37]—With intercooler
[38]—Constant track system with wishbone subframe, trailing arms and panhard rod
[39]—4-speed overdrive
[40]—Sold by Chrysler Corp. in the US

US Passenger Car Production

(by quarter, 1965-1983)

Year	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Total Year
1965	2,561,886	2,599,819	1,547,514	2,626,008	9,335,227
1966	2,495,224	2,426,637	1,256,834	2,426,017	8,604,712
1967	1,873,314	2,171,685	1,249,330	2,118,330	7,412,659
1968	2,320,644	2,522,814	1,480569	2,524,593	8,848,620
1969	2,319,226	2,209,639	1,557,543	2,137,984	8,224,392
1970	1,780,719	2,187,676	1,215,983	1,365,750	6,550,128
1971	2,346,293	2,332,614	1,729,291	2,175,455	8,583,653
1972	2,264,286	2,428,258	1,686,833	2,448,828	8,828,205
1973	2,710,004	2,707,739	1,897,873	2,351,536	9,667,152
1974	1,787,291	2,058,591	1,663,008	1,815,614	7,324,504
1975	1,298,538	1,833,297	1,663,119	1,921,997	6,716,951
1976	2,171,737	2,423,233	1,727,053	2,175,870	8,497,893
1977	2,336,842	2,638,411	1,931,717	2,306,684	9,213,654
1978	2,267,541	2,659,293	1,851,391	2,398,410	9,176,635
1979	2,411,032	2,483,132	1,655,922	1,883,576	8,433,662
1980	1,786,357	1,632,779	1,260,070	1,696,300	6,375,506
1981	1,553,969	2,019,828	1,380,321	1,299,020	6,253,138
1982	1,070,995	1,566027	1,233,736	1,202,758	5,073,516
1983	1,501,710	1,775,840	1,595,422	1,908,032	6,781,044

Source: Motor Vehicle Manufacturers Assoc.

U.S. PASSENGER CARS

1983 Model Year Factory Installation of Optional Equipment

Shown in Per Cent of Each Makes Production

MAKE	TRANSMISSIONS					ENGINES			POWER OPERATED								
	Auto-matic	Manual 3-speed	Manual 3-Speed w/ Overdrive Unit	Manual 4-Speed	Manual 5-Speed	V-8	6-Cyl-inder	4-Cyl-inder	Brakes	Steer-ing	Windows*	Seats	Air Condi-tioning	Tinted Glass	Locking Differ-ential	Movable Steer-ing Column	Disc Brakes
CHRYSLER CORP.																	
Chrysler																	
Cordoba	100.0	N.O.	N.O.	N.O.	N.O.	90.2	9.8	N.O.	100.0	100.0	71.3	59.8	97.2	100.0	N.O.	77.8	100.0
E Class/New Yorker	100.0	N.O.	N.O.	N.O.	N.O.	N.O.	N.O.	100.0	100.0	92.6	61.6	51.0	96.6	99.2	N.O.	73.8	100.0
Imperial	100.0	N.O.	N.O.	N.O.	N.O.	100.0	N.O.	N.O.	100.0	100.0	100.0	100.0	100.0	100.0	N.O.	100.0	100.0
LeBaron	98.8	N.O.	N.O.	N.O.	1.2	N.O.	N.O.	100.0	100.0	100.0	40.1	26.0	92.7	97.9	N.O.	58.3	100.0
New Yorker 5th Ave	100.0	N.O.	N.O.	N.O.	N.O.	98.0	2.0	N.O.	100.0	100.0	100.0	93.5	100.0	100.0	N.O.	95.1	100.0
Dodge																	
Aries	91.7	N.O.	N.O.	5.7	2.6	N.O.	N.O.	100.0	100.0	96.0	2.1	0.7	73.0	81.9	N.O.	12.3	100.0
Diplomat	100.0	N.O.	N.O.	N.O.	N.O.	65.4	34.6	N.O.	100.0	100.0	14.7	5.7	89.2	100.0	12.9	35.1	100.0
Mirada	100.0	N.O.	N.O.	N.O.	N.O.	82.4	17.6	N.O.	100.0	100.0	53.3	66.5	94.2	100.0	N.O.	69.1	100.0
Onmi/Charger	44.6	N.O.	N.O.	16.4	39.9	N.O.	N.O.	100.0	100.0	66.4	N.O.	N.O.	38.1	76.9	N.O.	N.O.	100.0
400	96.4	N.O.	N.O.	N.O.	3.6	N.O.	N.O.	100.0	100.0	99.2	28.3	14.4	83.2	96.4	N.O.	51.4	100.0
600	92.7	N.O.	N.O.	N.O.	7.3	N.O.	N.O.	100.0	100.0	100.0	33.0	22.5	91.8	97.2	N.O.	57.6	100.0
Plymouth																	
Gran Fury	100.0	N.O.	N.O.	N.O.	N.O.	71.1	28.9	N.O.	100.0	100.0	14.4	N.O.	89.4	100.0	26.4	29.7	100.0
Horizon/Turismo	54.6	N.O.	N.O.	18.8	26.6	N.O.	N.O.	100.0	100.0	63.5	N.O.	N.O.	39.2	72.5	N.O.	N.O.	100.0
Reliant	93.5	N.O.	N.O.	4.5	2.4	N.O.	N.O.	100.0	99.6	96.1	1.2	0.5	76.4	83.4	N.O.	11.5	100.0
FORD MOTOR CO.																	
Ford																	
Escort	46.0	N.O.	N.O.	34.4	19.6	N.O.	N.O.	100.0	70.7	59.2	N.O.	N.O.	42.9	50.6	N.O.	N.O.	100.0
EXP	17.8	N.O.	N.O.	12.3	69.9	N.O.	N.O.	100.0	100.0	63.5	N.O.	N.O.	41.7	70.7	N.O.	N.O.	100.0
Fairmont	98.9	N.O.	N.O.	1.1	N.O.	N.O.	85.8	14.2	100.0	99.5	1.8	0.6	88.2	91.9	1.1	14.4	100.0
LTD	47.4	N.O.	52.3	0.3	N.O.	N.O.	55.9	44.1	100.0	99.8	26.7	11.9	93.9	96.9	2.1	58.0	100.0
LTD Crown Victoria	N.O.	N.O.	100.0	N.O.	N.O.	100.0	N.O.	N.O.	100.0	100.0	61.1	55.2	97.9	98.4	8.2	68.5	100.0
Mustang	56.0	N.O.	N.O.	24.2	19.8	30.3	44.0	25.7	96.8	97.5	26.1	N.O.	76.2	88.4	32.1	42.5	100.0
Thunderbird	31.7	N.O.	58.0	N.O.	10.3	31.9	57.8	10.3	100.0	100.0	67.2	58.6	96.5	98.3	12.8	81.3	100.0
Tempo ('84)	72.6	N.O.	N.O.	1.0	26.4	N.O.	N.O.	100.0	100.0	98.5	5.3	2.9	77.8	91.6	N.O.	27.0	100.0
Lincoln																	
Continental	N.O.	N.O.	100.0	N.O.	N.O.	100.0	N.O.	N.O.	100.0	100.0	100.0	100.0	100.0	100.0	5.9	100.0	100.0
Mark VI	N.O.	N.O.	100.0	N.O.	N.O.	100.0	N.O.	N.O.	100.0	100.0	100.0	100.0	100.0	100.0	7.4	100.0	100.0
Town Car	N.O.	N.O.	100.0	N.O.	N.O.	100.0	N.O.	N.O.	100.0	100.0	100.0	100.0	100.0	100.0	3.3	98.8	100.0
Mercury																	
Capri	54.8	N.O.	26.4	15.0	3.8	24.9	43.0	32.1	100.0	87.5	11.9	N.O.	77.3	92.1	29.9	34.9	100.0
Cougar	41.9	N.O.	58.1	N.O.	N.O.	34.4	65.6	N.O.	100.0	100.0	72.7	49.2	97.6	98.5	2.5	77.5	100.0
LN7	20.4	N.O.	N.O.	N.O.	79.6	N.O.	N.O.	100.0	100.0	66.1	N.O.	N.O.	60.3	100.0	N.O.	N.O.	100.0
Lynx	50.3	N.O.	N.O.	27.2	22.5	N.O.	N.O.	100.0	67.3	67.3	N.O.	N.O.	51.9	56.2	N.O.	N.O.	100.0
Gran Marquis	N.O.	N.O.	100.0	N.O.	N.O.	100.0	N.O.	N.O.	100.0	100.0	100.0	88.8	99.7	99.6	5.5	96.0	100.0
Marquis	39.0	N.O.	60.7	0.3	N.O.	N.O.	95.7	4.3	100.0	100.0	44.5	31.3	93.9	92.1	2.0	73.3	100.0
Zephyr	99.5	N.O.	N.O.	0.5	N.O.	N.O.	89.4	10.6	100.0	99.8	2.6	0.6	94.8	85.9	0.6	19.6	100.0
Topaz ('84)	72.6	N.O.	N.O.	1.0	26.4	N.O.	N.O.	100.0	100.0	98.5	5.3	2.9	77.8	91.6	N.O.	27.0	100.0
GENERAL MOTORS CORP.																	
Buick																	
Century	99.7	N.O.	0.3	N.O.	N.O.	N.O.	75.0	25.0	100.0	100.0	41.3	27.2	96.2	97.6	N.O.	77.7	100.0
Electra	N.O.	N.O.	100.0	N.O.	N.O.	94.5	5.5	N.O.	100.0	100.0	100.0	98.4	100.0	100.0	5.2	98.8	100.0
LeSabre	59.0	N.O.	41.0	N.O.	N.O.	74.5	25.5	N.O.	100.0	100.0	61.9	55.4	99.0	99.3	3.0	86.1	100.0
Regal	98.4	N.O.	1.6	N.O.	N.O.	2.2	97.8	N.O.	100.0	100.0	47.5	28.6	97.5	98.5	2.0	78.3	100.0
Riviera	N.O.	N.O.	100.0	N.O.	N.O.	91.1	8.9	N.O.	100.0	100.0	100.0	100.0	100.0	100.0	N.O.	100.0	100.0
Skyhawk	78.4	N.O.	N.O.	5.9	15.7	N.O.	N.O.	100.0	100.0	97.3	9.3	4.1	79.8	89.3	N.O.	48.3	100.0
Skylark	97.6	N.O.	N.O.	2.4	N.O.	N.O.	53.6	46.4	100.0	100.0	11.4	5.6	89.3	93.2	N.O.	55.9	100.0
Estate Wagon	N.O.	N.O.	100.0	N.O.	N.O.	100.0	N.O.	N.O.	100.0	100.0	84.9	83.7	100.0	100.0	13.8	90.7	100.0
Cadillac																	
Cimarron	83.0	N.O.	N.O.	N.O.	17.0	N.O.	N.O.	100.0	100.0	100.0	87.9	83.8	100.0	100.0	N.O.	94.0	100.0
Comm. Chassis	100.0	N.O.	N.O.	N.O.	N.O.	100.0	N.O.	N.O.	100.0	100.0	N.O.	N.O.	100.0	100.0	.44	100.0	100.0
DeVille	N.O.	N.O.	100.0	N.O.	N.O.	100.0	N.O.	N.O.	100.0	100.0	100.0	100.0	100.0	100.0	N.O.	91.6	100.0
Eldorado	N.O.	N.O.	100.0	N.O.	N.O.	100.0	N.O.	N.O.	100.0	100.0	100.0	100.0	100.0	100.0	N.O.	97.5	100.0
Fleetwood Brougham	N.O.	N.O.	100.0	N.O.	N.O.	100.0	N.O.	N.O.	100.0	100.0	100.0	100.0	100.0	100.0	N.O.	93.0	100.0
Fleetwood Limo	N.O.	N.O.	100.0	N.O.	N.O.	100.0	N.O.	N.O.	100.0	100.0	100.0	100.0	100.0	100.0	N.O.	95.7	100.0
Seville	N.O.	N.O.	100.0	N.O.	N.O.	100.0	N.O.	N.O.	100.0	100.0	100.0	100.0	100.0	100.0	N.O.	98.2	100.0
Chevrolet																	
Camaro	76.7	N.O.	N.O.	2.5	20.8	58.4	53.2	6.4	100.0	100.0	45.1	12.0	83.4	93.8	12.3	73.2	100.0
Caprice/Impala	100.0	N.O.	N.O.	N.O.	N.O.	85.9	14.1	N.O.	100.0	100.0	52.0	35.8	96.7	95.5	5.5	70.2	100.0
Cavalier	73.6	N.O.	N.O.	13.7	12.7	N.O.	N.O.	100.0	100.0	90.2	11.2	1.5	64.7	77.7	N.O.	33.4	100.0
Celebrity	100.0	N.O.	N.O.	N.O.	N.O.	N.O.	64.4	35.6	100.0	100.0	18.0	6.3	93.1	93.4	N.O.	55.5	100.0
Chevette	61.2	N.O.	N.O.	34.8	4.0	N.O.	N.O.	100.0	13.9	16.7	N.O.	N.O.	38.6	44.9	N.O.	10.0	100.0
Citation	89.7	N.O.	N.O.	10.3	N.O.	N.O.	43.1	56.9	95.6	98.4	2.9	N.O.	75.7	79.3	N.O.	24.8	100.0
Corvette ('84)	99.8	N.O.	N.O.	0.2	N.O.	100.0	N.O.	N.O.	100.0	100.0	100.0	94.5	100.0	100.0	100.01	100.0	100.0
Malibu	100.0	N.O.	N.O.	N.O.	N.O.	27.4	71.8	N.O.	100.0	100.0	7.9	0.1	84.7	84.9	4.1	34.3	100.0
Monte Carlo	100.0	N.O.	N.O.	N.O.	N.O.	47.6	52.4	N.O.	100.0	100.0	90.1	11.8	92.4	90.1	3.1	66.2	100.0
Oldsmobile																	
Custom Cruiser	0.2	N.O.	99.9	N.O.	N.O.	100.0	N.O.	N.O.	100.0	100.0	77.7	69.7	98.9	98.6	12.8	84.0	100.0
Cutlass Ciera	99.9	N.O.	.03	N.O.	N.O.	N.O.	57.7	42.3	100.0	100.0	40.7	0.2	95.9	97.4	N.O.	78.3	100.0
Cutlass Supreme	99.0	N.O.	1.0	N.O.	N.O.	22.7	77.3	N.O.	100.0	100.0	42.1	22.7	98.4	98.2	2.7	76.8	100.0
Delta 88	66.1	N.O.	33.9	N.O.	N.O.	94.7	5.3	N.O.	100.0	100.0	65.0	54.8	98.5	98.9	3.4	87.3	100.0
Firenza	79.8	N.O.	N.O.	4.6	15.6	N.O.	N.O.	100.0	100.0	97.8	7.0	2.9	78.2	84.4	N.O.	58.0	100.0
98	N.O.	N.O.	100.0	N.O.	N.O.	99.5	0.5	N.O.	100.0	100.0	100.0	100.0	100.0	100.0	4.9	97.5	100.0
Omega	97.4	N.O.	N.O.	2.6	N.O.	N.O.	41.0	59.0	100.0	100.0	9.2	2.2	85.9	88.7	N.O.	52.8	100.0
Toronado	N.O.	N.O.	100.0	N.O.	N.O.	99.3	0.7	N.O.	100.0	100.0	100.0	100.0	100.0	100.0	N.O.	100.0	100.0
Pontiac																	
Bonneville	100.0	N.O.	N.O.	N.O.	N.O.	41.3	58.7	N.O.	100.0	100.0	50.5	32.5	98.1	98.6	3.5	76.2	100.0
Firebird	80.8	N.O.	52.0	1.5	17.6	54.7	29.1	11.2	100.0	100.0	56.1	8.3	91.3	97.4	26.0	72.5	100.0
Grand Prix	100.0	N.O.	N.O.	N.O.	N.O.	41.1	58.7	N.O.	100.0	100.0	61.2	28.5	97.9	98.6	3.0	83.2	100.0
Parisienne	100.0	N.O.	N.O.	N.O.	N.O.	96.1	3.9	N.O.	100.0	100.0	78.5	67.2	99.5	99.6	39.2	94.2	100.0
Phoenix	94.1	N.O.	5.9	N.O.	N.O.	N.O.	32.0	68.0	98.8	100.0	5.4	2.8	89.1	94.0	N.O.	17.1	100.0
1000	59.7	N.O.	N.O.	34.1	6.1	N.O.	N.O.	100.0	17.9	31.4	N.O.	N.O.	51.3	58.8	N.O.	17.1	100.0
2000	69.2	N.O.	N.O.	3.3	27.5	N.O.	N.O.	100.0	100.0	93.1	6.6	1.5	76.4	87.3	N.O.	47.9	100.0
6000	100.0	N.O.	N.O.	N.O.	N.O.	N.O.	56.7	43.3	100.0	100.0	47.1	16.3	97.3	98.3	N.O.	75.6	100.0
VOLKSWAGEN																	
Rabbit hatchback	14.5	N.O.	N.O.	26.4	59.1	N.O.	N.O.	100.0	100.0	21.4	N.O.	N.O.	38.5	100.0	N.O.	N.O.	100.0
Rabbit GTI	N.O.	N.O.	N.O.	N.O.	100.0	N.O.	N.O.	100.0	100.0	N.O.	N.O.	N.O.	53.9	100.0	N.O.	N.O.	100.0

* Not offered as standard or optional equipment.

CHILTON'S 5/1984

AUTOMOTIVE INDUSTRIES

NUMBER ONE IN THE INDUSTRY SINCE 1895

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CONFLICT OR COOPERATION?

VW & Honda Compared:
PLANTING ROOTS IN AMERICA

AMERICAN STEEL FIGHTS BACK!

INCLUDING TRUCK & OFF-HIGHWAY INDUSTRIES

AUTOMOTIVE INDUSTRIES

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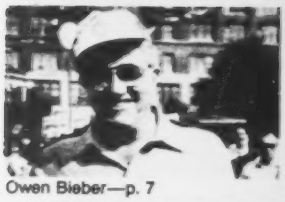

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QUOTABLE

"If every other player in our market were to join up with Chrysler, and I mean Ford and AMC, and VW, all the other Japanese, Honda, Nissan, Mazda, Peugeot, Volvo, Mercedes, Rolls Royce and *every* other car maker in the world, we still wouldn't have as much US market share as GM and Toyota combined."—Chrysler chairman Lee Iacocca testily testifying at a hearing on the GM/Toyota joint venture and its effects on the US auto industry, in Washington, DC.

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AMERICAN STEEL FIGHTS BACK!

With rationalization and modernization, the American steel industry is slowly rebuilding its competitive strength, and the price and quality of its products.

by George McManus

"The steel industry is doing just what it should be doing," says Roger B. Smith, chairman of General Motors.

"They're rationalizing their volume, their capacity. They're modernizing and they're coming in with new equipment."

Steel companies are doing these things and they're doing them in a hurry. Surplus, high cost facilities are being retired. Just in the past year or so, shutdowns have reduced capacity by 15 million tons (*13.6 million t*).

Production is being consolidated in the most efficient facilities. As one way of doing this, two large mergers have been proposed. United States Steel Corp. proposed buying the steel operation of National Intergroup Inc. LTV Corp., which owns Jones & Laughlin Steel Corp., announced a merger with Republic Steel Corp.

Modernization Push

The merger push is on hold pending anti-trust rulings, but modernization programs are going forward. A massive conversion to continuous casting is underway. A basic change is taking place in steel refining.

Steel companies have been doing one more important thing—cutting prices. As of February, discounts up to $100 a ton were being offered on sheet products. The average price of sheet was no higher than it was in 1981.

Despite losing $6 billion over the

George McManus is Steel Editor of Chilton's Iron Age *magazine.*

Bethlehem Steel's continuous heat-treating line at Burns Harbor, IN. With continuous annealing, it is possible to produce a sheet that is soft and formable out of the mills, but which rapidly work hardens in auto presses.

One-sided galvanized produced at National Steel's Midwest Plant. Before there is a full conversion to electrolytic coating, there will have to be decisions on exactly what kind of coating the automakers want.

past 2 years, the steel industry is in a very dynamic state. Typical of the new mood is the response to the auto industry's call for better corrosion resistance.

The auto companies want a coated sheet that is paintable, weldable and formable. The best way of meeting these requirements seems to be with electrolytic galvanizing. Nearly all the coating lines right now are of the hot dip variety.

Accordingly, a big electrolytic program has been started. Bethlehem Steel Corp. and Inland Steel Co. have joined in a development program for electrolytic coating. Separate from this, Bethlehem is converting a tinplate line at Burns Harbor, IN to electrolytic galvanizing.

National Intergroup has launched an electrolytic project at its Great Lakes plant. Wheeling-Pittsburgh Steel Corp. has joined with Nisshin Steel Corp. Ltd. of Japan in a venture for coated sheet.

Beyond this change and consolidation there are bright spots of increased employment beginning to appear in the domestic steel industry. On March 18, Weirton Steel Corp. called back 143 of its workers. This was due to the start-up of the rebuilt No. 3 blast furnace. (With this furnace operating, Weirton will have four blast furnaces running for the first time since 1979.)

This latest recall brings Weirton's active workforce to 7777. About 600 have been called back as a result of the improvement in the sheet market, although there are still 1386 on layoff.

All this is good timing for Weirton which recently severed ties with National Intergroup, and began operating as the largest employee-owned corporation in the US.

Rationalization Push

In the American steel industry as a whole, rationalization continues as a response to the market. Since the start of 1982, the steel market has taken an average of about 65 million tons of steel a year (*59.0 million t/yr*). In the 1973 boom, domestic mills shipped over 111 million tons of finished steel and produced over 150 million tons of raw steel (*100.7 million and 136.1 million t*).

The current imbalance of supply and demand has created intense market pressures. One result has been the price cutting. Another effect has been plant shutdowns—the 15 million tons scratched last year was on top of a 10-million-ton subtraction earlier.

Consolidation of the remaining capacity will probably extend across company lines. David M. Roderick, chairman of US Steel, believes mergers are a must.

"Economically rational mergers will create a more efficient industry," says Roderick. "The preservation of all efficient domestic productive units is a pro-competitive policy."

If large steel mergers are blocked by the government, there could be a pooling of resources through joint ventures and through a sharing of production. A number of domestic mills bought foreign slabs last year. Steel structurals were sold within the domestic industry.

The positive side of steel restructuring is modernization of the remaining facilities. Considering the financial state of the steel industry, the modernization effort is truly remarkable.

Continuous Casters Come On

Something like 20 large continuous casters have been installed recently or are now in the works. Much of this activity involves slab machines for sheet products.

Big slab casters were started in the last few months at the Indiana Harbor plant of Jones & Laughlin and at the Cleveland plant of Republic Steel. Earlier, slab machines came on stream at the Great Lakes and Granite City plants of National Intergroup.

Coming up are slab casters for US Steel at Gary, IN and at Fairfield, AL; for Bethlehem Steel at Burns Harbor and at Sparrows Point, MD; for Inland Steel; and for the Rouge Steel plant of Ford Motor Co.

Continuous casting lowers the cost of producing sheet by giving 10-15% more usable steel. "Continuous casting makes possible high yield, energy [savings] and other cost savings," says Robert C. Wilkins, finance VP of Bethlehem. "These savings amount to about $35 to $40 on each ton."

Bethlehem's casting program points up the bold manner in which steel companies are going about their modernization. Bethlehem's $540 million outlay for casters will be provided entirely by borrowing. Under a novel financing scheme, repayment will be tied to tons produced on the casters. No money will be paid until the casters start producing tons and generating savings.

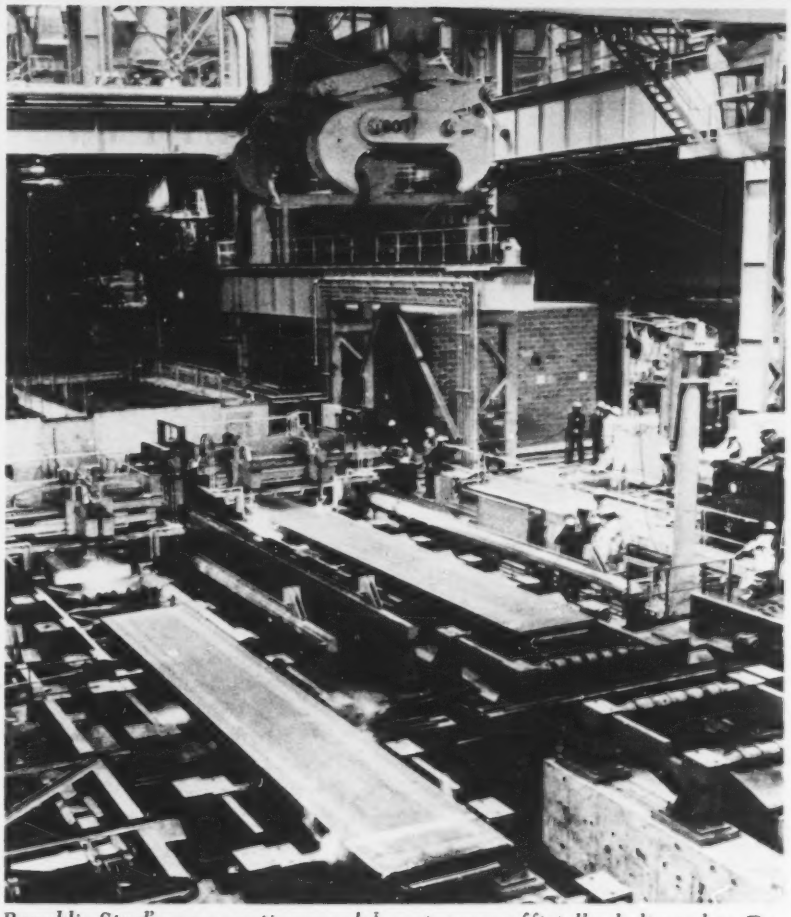
This is heady stuff in an industry that has generally followed a pay-as-you-go policy in capital spending. With internal funds depleted and with urgent modernization needs, steel companies have concluded they must base their spending on expectations. Most of the big mills are availing themselves of the generous financing available from foreign equipment suppliers.

Quality Up

Continuous casting also improves quality. The quality aspect was noted when US Steel announced an upgrading of its first caster at Gary.

"Changes in markets require a quality of steel which can be viably produced only from aluminum killed continuously cast slabs," says R.W. Smith, who was then US Steel's group VP, steel. "The most significant change is evolving in the automotive market with the increased use of high strength steels to reduce the weight of cars."

At the December startup of J&L's Indiana Harbor caster, cost savings were noted by David H. Hoag, presi-



Republic Steel's new continuous slab caster was officially dedicated in December at its Cleveland steel plant. Continuous casting lowers the cost of producing sheet by giving 10-15% more usable steel.

dent. "Equally important," says Hoag, "is the more consistent surface quality the cast slabs permit us to deliver to customers in our finished products. With the caster up and running, J&L will be able to provide quality products equal to any in the world."

Uniform Chemistry A Plus

Continuous casting provides uniform chemistry and a uniform internal structure. Rapid solidification inhibits the congregating of impurities and the growth of coarse grains. The continuously cast product is preferred by a growing number of sheet users.

Apart from direct quality gains, continuous casting is closely tied to ladle metallurgy. Partly to facilitate efficient casting, steel companies have installed a variety of ladle treatment stations. These provide a buffer between the batch melting furnaces and the continuous casters.

In addition to smoothing out the overall operations, the ladle systems make for better quality. Under the practice rapidly being adopted, electric furnaces and oxygen furnaces are being used primarily for rapid melting and partial refining of the steel. The final alloying and cleansing of the steel is then done in the ladle. Temperatures are adjusted. Desulfurizers and deoxidizers are injected. The steel is mixed and rinsed.

The result is a very clean steel with precise control of chemistry. A number of small, subtle changes are bringing a significant improvement in quality. Sheet users are assured of uniform directional properties because sulfur content can be reduced to low levels in the ladle systems and sulfur shape can be controlled.

Total Yearly Automotive Steel Shipments

(thousands of net tons)

Year	Tons
1983	12,076
1982	9,288
1981	13,154
1980	12,124
1979	18,621
1978	21,253
1977	21,490
1976	21,351
1975	15,214
1974	18,928
1973	23,217

Source: AISI

Producing Galvanized Sheet

Ladle degassing is one way of producing the formable galvanized sheet required by the auto industry. With vacuum degassing, the carbon content of the steel can be pulled way down. If a pinch of columbium or titanium is added to the low carbon steel, good forming properties are retained in the galvanizing process.

This is important. Electrolytic coating may be the wave of the future but people are going to have to live with the hot dip process for some time. Before there is a full conversion to electrolytic, there will have to be decisions on exactly what kind of coating is best.

Zinc will probably remain the big protective agent but various combinations of nickel and chromium are being considered. Steel companies must stay flexible because the auto industry has been known to change its mind.

At one time, it appeared that one-side galvanized was the ideal product for auto body protection. The uncoated sheet surface would be painted and used on the outside. The coated surface would be used inside to fight corrosion.

One-side coating systems were developed by US Steel and Armco Inc. Enough of the one-side product is being used to keep both lines fully loaded, but for the corrosion guarantees expected on 1987 car models, a sheet coated on both sides will probably be needed.

(Continued)

Continuous Annealing For HSS

Continuous annealing provides another example of changing requirements. A few years ago, weight reduction was a major objective in Detroit. High strength steel was seen as one of the best answers to shedding excess pounds.

As a means of providing the high strength sheet, Bethlehem and Inland installed continuous annealing lines. By rapidly heating and cooling steel, these lines can develop extra strength without expensive alloy additions.

Of special interest was something called dual phase steel. With continuous annealing, it was possible to produce a sheet that was soft and formable out of the mills, but which rapidly worked hardened in auto presses.

The continuous lines came on stream in the first half of 1983. The auto industry was still emerging from its deep slump at that time. This timing was probably a factor but it appeared to steel people that the auto companies had lost some of their enthusiasm for high strength sheet. The dual phase grade seemed to have fallen out of favor.

The last word isn't in on high strength steel or continuous annealing. For a variety of reasons, the product and the process will almost certainly find widespread use. Nevertheless, the experience of the last few years has shown that the priorities of auto companies can change very quickly.

Revolution Coming

Down the road for sheet producers and sheet users may be a revolutionary development. A program sponsored by the Department of Energy calls for casting molten steel directly into thin sheet.

As it is now, sheets are made by taking large ingots or slabs and mashing them into thin material. The need for this compacting is one thing that has shaped the steel industry. Slabs are rolled into sheet or hot strip mills. These are high cost, high production machines. A single strip mill can cost half a billion dollars and roll 5 million tons a year (*4.5 million t/yr*).

Because of these numbers, steel sheet is made in large plants by large companies. Enormous amounts of energy are consumed in the hot rolling.

Bypassing The Strip Mill

The aim now is to bypass the strip mill by directly casting material measuring from .010-.187 in. (*.25-4.75 mm*) thick. With existing casters, the minimum thickness is 6 in. and on the new casters, a 10 in. slab is typical (*152 and 254 mm*).

In the new program, researchers are actually trying to scale up the techniques used by Allied Corp. in casting extremely thin foils. Allied takes a molten stream and plays it on a rapidly moving surface. The metal is cooled so fast it retains the amorphous structure of a liquid and has exceptional electrical properties.

Allied is working with exotic alloys and is producing strip only about .001 in. thick (*.025 mm*). Maximum width is about 7 in. (*178 mm*). The research program aims at producing sheet up to 72 in. (*1829 mm*) wide and about as thick as material coming off a strip mill.

Big Cost Reductions Possible

If successful, the thin casting program will bring big cost reductions. It will make it possible for small companies to produce sheet.

Some metallurgists feel this is all blue-sky romancing. Nevertheless a number of important people and companies are backing the strip casting program. US Steel and National Intergroup are among the companies which have made proposals to the Department of Energy.

In any case, the casting program brings out the active state of the industry. Steel people are receptive to change. One kind of change is consolidation by the tonnage producers. Among other things, this would seem to tie in with GM's plan for concentrating procurement.

At the same time, some types of steel production are being fragmented. Mini-mills have taken over a large portion of the merchant bar market and are moving into industrial bars.

Tonnage producers are withdrawing from the rod and wire markets. The mini-mills are expanding in these areas. A portion of the medium structural market is being taken over by mini-mills and imports.

Out of all this will hopefully emerge a steel industry that is smaller but strong and mobile. ■

Timken's Faircrest Plant—High Tech Americanism

Say "Timken" and nine out of ten people will say "ball bearings." But the company's been in the steel business since 1916 and expects to have its new $500 million Faircrest specialty alloy steel plant fully operational by late 1985.

"In the US, this is the only 'greenfield' integrated steel plant going up," says a Timken spokesman. Timken's investment in the plant, located near Canton, OH, equals roughly two-thirds of the company's present net worth.

(It's interesting to note that in 1982, the year the company broke ground for the new mill, Timken reported its first loss [$3 million] in 50 years. And while plans were slowed somewhat during the recession, the spokesman indicates the downturn didn't alter the overall plan.)

The plant's continuous thermal treatment (CTT) facility, which went operational late last year, produces bar and tubular steel. Facilities under construction now include a 160-ton (*145-t*) computer controlled electric arc furnace made by Krupp International Inc. of New York. This will increase Timken's total melting capacity from 1 million to 1.5 million tons per year (*907,000 to 1.4 million t*).

The plant will directly employ 400-500 workers initially, and 800 workers if full expansion plans are carried through. Its lower labor requirements as compared with traditional mills result from intense process computerization.

Timken is reportedly spending over $5.8 million on computer equipment and software. The CTT facility includes a computer controlled austenitizing furnace and the 1600-ft (*490-m*) rolling mill includes over 100 miles (*161 km*) of wiring conduit for the mill's electronic systems.

Significantly, Timken indicates over $16 million of it $500 million investment will go toward environmental controls. ■

—by Lance A. Ealey

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GM's Plans Revealed

INSIDE THE WORLD'S MOST AUTOMATED ASSEMBLY PLANT

9th Annual

SOURCE GUIDE TO SUPPLIERS

AUTOMOTIVE INDUSTRIES

June, 1984/Volume 164, Number 6

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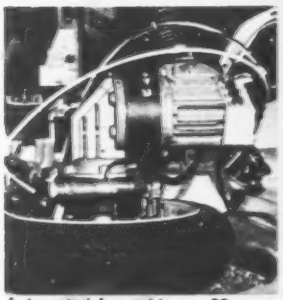

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COVER

Robots, robots everywhere . . . putting on tires and inserting engines in the world's most automated assembly plant.

NEXT MONTH

What if . . . the Japanese import restraints are allowed to lapse? Will the orient unleash an onslaught of big *and* small cars?

QUOTABLE

Chrysler chairman Lee Iacocca, on the single most important reason for the company's dramatic turnaround—"When you're gonna die, it focuses your attention."

VWoA VP James Fuller on the fall and hopeful rise of his company—"German engineering is the base-rock of our company; we shouldn't forget it. When we have, it's been a terrible mistake."

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Automotive Industries' Survey

ANALYSTS SEE CONTINUED UPSWING AND PROBABLE STRIKE

Major automotive analysts, surveyed by *AI*, see US car sales inching toward 8 million this year, and confirm the likelihood of a UAW strike at GM this fall.

by Neil M. Szigethy

Optimism reigns. While no one is really going out on a limb, and certainly most analysts qualify their forecasts with the ever popular "if interest rates don't continue upward," everyone is in general agreement that the industry is on a healthy upswing.

AI last surveyed auto analysts for our December '83 issue (see "Industry Analysts: Welcome To Easier Times," p. 63). Although the sampling was slightly different, we did ask for sales and production figures for the same period—calendar year 1984.

Forecasts Higher Now

On average, all the responses for our latest mid-year forecast are significantly higher than that earlier forecast, with the largest increase seen in total US and import truck sales.

A good example of the kind of optimism we recorded in our latest survey of auto analysts was the comments by Peggy Pentecost of the Automotive Information Council. "Despite a softening of the car sales rate in March," Pentecost said, "consumer auto buying attitudes remain high.

"The latest survey of public opinion on car and truck buying intentions, made by the University of Michigan's Institute For Social Research, found one of every six families indicated they intended to buy a new vehicle this year," she said.

Analysts See Steady Upswing (in millions) Source: Automotive Industries Marketdata

	Arthur Andersen & Co.	Automotive Information Council	Chase Econometrics	Predicasts	Arthur D. Little	AP Parts Co.	Merrill Lynch	Manufacturers Hanover Trust	J.D. Power & Associates	
PASSENGER CARS										
1984 US Production	7.8	7.7	8.0	7.95	7.6	7.5	8.0	7.9	7.8	
1984 Sales, US & Imports	10.2	10.2	10.5	10.7	10.3	10.3	10.4	10.3	10.4	
LIGHT TRUCKS										
1984 US Production	—	2.7	2.7	2.675	2.4	2.7	2.7	—	3.2	
1984 Sales, US & Imports	—	3.1	3.7	3.2	2.95	3.5	3.5	—	3.8	
Will The UAW Strike This Fall?	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	
Against Whom?	GM	—	GM	GM	—	GM	GM	—	Ford	